

POWERDRIVE WHEELCHAIR FEATURES



Introduction

The purpose of this brochure is to highlight some of the unique equipment components of powerdrive wheelchairs for people with high level spinal cord injuries. It is intended to inform the assessment and prescription process.

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Tilt in Space

1. Description

Allows the entire seating unit to tilt without opening the “hip” (seat to backrest) angle.. The individual can independently control the amount or degree of tilt. The tilt is most commonly operated directly by the main access switch (hand or chin joystick, or sip/puff),once this mode is selected. On some chair models the client may be required to operate a separate switch or scan through control options.

Manual Tilt / Gas Tilt may also be an option to assess for some clients who have maximum care support and/or limited funds. Chair can be placed in a small amount of fixed tilt ie 5° if client prefers a permanent repositioning

Note: Retrofit of Tilt in space may not be possible a different interface for the chair is required.

2. Criteria for Use

Clients with complete injuries of C6 or above may require power tilt. Clients who experience other complications may find power tilt can

- assist respiratory function
- reduce care support required
- provide rest position without transfer to bed, assisting with pain and fatigue
- enhance postural stability and balance (including on steep slopes/gutters etc)

It has also been able to promote the individual to care for their own needs by:

- allowing repositioning to assist with pressure relief
- reducing lower limb oedema by elevating feet
- promoting bladder drainage through repositioning

3. Features Available

- Degree of tilt currently available from 25° to 65° (greater than 55° requires a Centre of Gravity weight shift mechanism that works together with the tilt in space)
- Variable centre of gravity on chair

4. Key Points to Consider

- Home access - table heights, circulation spaces
- Transport - van access, head clearance required
- Head support required when using tilt (see headrest options)
- Funding – currently subsidized by MASS where clinically justified
- Interface with other components - ECU's, power leg rests
- Assess postural changes, impact on spasm
- Skin care
- Having tilt in space will raise height of chair by varying amounts
- Ability to maintain arm position when in tilt, elbow stops may be needed
- Access to controls to operate tilt from all positions
- Clients should not drive in tilt unless accessing kerbs, some systems have a stop on tilt position whilst driving



Recline

1. Description

Allows the back rest, only, to recline relative to the seat. The degree of angle of reclined position can be controlled by the client or manually by carer.

Note: Power recline is **not** recommended for use in isolation for clients with Spinal Cord Injury because of concerns with sheer, unless it allows for the seat to move as the recline is used (called weight shift)

2. Criteria for Use

- When Power Tilt alone has not achieved desired outcome. Refer to “criteria for use” outlined in Power Tilt section
- Can assist with positioning issues
- Can assist with bladder drainage

3. Features Available

- Manual or power options available
- Weight shift available on seat

4. Key Points to Consider

- Issues included in tilt in space section, with particular emphasis on skin care, hand support and postural changes, especially arm positioning (arms tend to slide significantly backwards so adequate support needs to be guaranteed)

- Elevating leg rests may be required when prescribing power tilt and recline combination
- A variety of models of recline / tilt system are available on the market, cost is high and no MASS subsidy is available

Armrests

1. Description

Positioned on sides of wheelchair to ensure shoulders and forearms are supported and to assist with upper body postural stability.

2. Criteria for Use

- All powerdrive wheelchairs require armrests. The type of armrests will depend on functional ability of the individual and other factors such as tasks to be accomplished in the chair

3. Features Available

- Standard padded armrest
- Height adjustable
- Desk height
- Various lengths and widths
- Edge lip for protection – metal outer edge lip
- Side panel armrests
- Control arm – drop down or Quad release or swing away to facilitate table access
- Removable
- Flip up

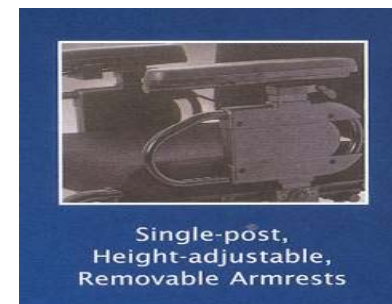
C4 quadriplegic or above

- Arm trough support (such as Ottoboch)
- Elbow blocks (to assist with arm support during tilt)

- Modular hand pad
- May need to consider specific hand position

4. Key Points to Consider

- Support should reduce shoulder pain
- Oedema management enhanced using limb position
- Cosmetic appearance
- Access to joystick (if appropriate)
- Upper body posture
- Access to tables and desks
- Transfers
- Stability when moving in wheelchair
- Funding – MASS subsidy with clinical justification of features
- Lap-tray interface
- Spasm
- Sheepskin may be needed to protect skin in arm trough



Footplates and Hangers

1. Description

Hangers and calf supports are positioned behind legs to provide support to leg whilst seated in wheelchair. Footplates designed to position and support foot.

2. Criteria for Use

- Hangers and footplates required with all powerdrive wheelchairs.
- Calf supports required when wheelchair is in reclined or tilted position and to encourage correct positioning of legs in wheelchair. May also assist with positioning during spasm.

3. Features Available

- Padded
- Detachable
- Elevating – manual and power
- Swingaway
- Calf strap to prevent feet from falling off footplates
- Heel loops
- Calf pads
- Single piece footplate/footboard
- Lockdown two piece
- High mount attachment to accommodate tilt
- Hanger angle available to position footplates as desired

4. Key Points to Consider

- Reclining wheelchair changes position of lower limbs and they may require altered support
- Tilt in space
- Oedema – elevating legrests allow for independent raising of lower limbs
- Transfers – elevating legrests often stick above height of seat and need to be avoided in transfer
- Funding – MASS subsidy available with clinical justification
- Spasm
- Elevating legrests increase length of chair
- Single piece footplate can prevent feet from slipping/spasming between swingaways. These can be designed to flip up.



Control Options

Key Points to Consider for All Control Options

- Head control
- Head support
- Pain
- Fatigue
- Need to access other accessories such as tilt in space and ECU
- Long-term effect on neck joints/ chin/jaw and teeth
- On/off switch must be accessible and in suitable position ie raised
- Suspension springs on the powerchair base may facilitate smoother ride
- Aesthetics of control equipment close to face
- Mounting for mouthsticks / drink container
- Some control options are not widely available in Australia, therefore trial and maintenance are issues
- Maintenance, repair and replacement of customised features
- Warranty on powerchair if alterations are made
- Training of client and carers
- Programming of all parameters
- Spasm
- Cognition and new learning ability

Joystick Controls

1. Description

Commonly used controls, designed to drive chair using hand and upper limb movement

Document developed by OT staff, QSCIS

2. Criteria for Use

- Client has active range and control which allows for controlled movement of chair.
- Switching possible to manage other control functions ie tilt in space
- Splinting to support wrist and hand position may enhance ability to manage controls

3. Features Available

- Ball, enlarged ball
- T-bar
- U shaped
- Cylinder
- Carrot Toggle
- Individual client variation possible, depending on skills of therapist



Updated Dec 07

Chin Controls

1. Description

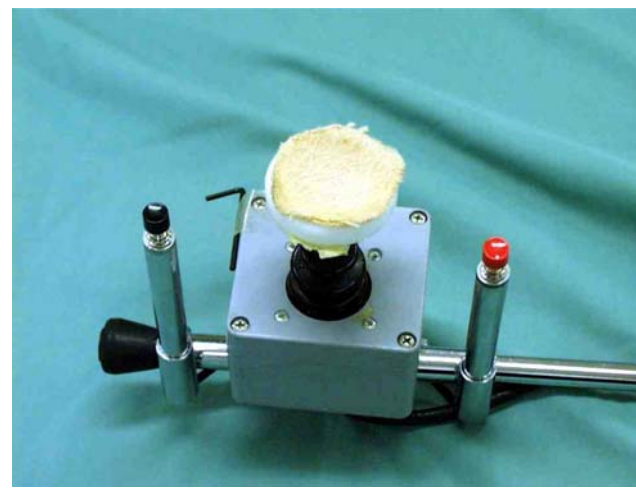
Enables powerchair to be driven through chin/jaw movement.

2. Criteria for Use

- Level of injury of C3 complete or above usually indicates a need. May be considered for clients with a C4 complete injury when pain and fatigue are issues. An individual with a complete level of injury of usually requires this type of controls

3. Features Available

- Joystick with ball, dished knob or other individualised adaptation
- Speed, acceleration and turn rate adjustable through programmer
- Reversal of directions on joystick configuration may improve function of people with muscle imbalance ie towards body for forward, away from body for reverse
- Sip/Puff switch accessory to swing chin control arm into position or away
- Latch function can be programmed to enable chair to continue moving for specified period (approx. 15 sec - 1 minute) once activated
- Mini joystick positioned at chin or lip



Sip and Puff

1. Description

Enables powerchair to be driven through breath control.

2. Criteria for Use

- Level of injury of C3 complete or above usually indicates a need. May be considered for clients with a C4 complete injury when pain and fatigue are issues
- Used in conjunction with other controls ie chin controls to swing away features whilst managing other tasks

3. Features Available

- Latch feature essential (allows for “cruise control” type operation)
- Kill (emergency stopping) switch for safety
- Ventilator settings and type of tracheotomy valve



Head Controls

1. Description

Enables powerchair to be driven using head and neck movement or positioning on headrest.

2. Criteria for Use

- Level of injury of C4 complete or above usually indicates a need
- More commonly prescribed in USA where they do not use chin controls

3. Features Available

- May be operated by applying pressure to a headrest pad, a series of switches (usually 3) or by infra-red detection of head position (Peachtree)
- On/off and forward/reverse may be separate single switches
- Latch function enables chair to continue moving for specified period once activated
- Peachtree has proportional control i.e. further away head is from controller, the faster chair will go
- Autostop function for safety
- Speed, acceleration and turn rate may be adjustable through programmer



Attendant Controls

1. Description

Enables powerchair to be driven by attendant.

2. Criteria for Use

- If client is unable to control powerchair independently and safely. This may be in certain environments such as outdoors or in certain situations when fatigue, spasm or positioning is a factor
- May be used in conjunction with other control devices. Overrides these.

3. Features Available

- Usually standard joystick. Frequently, joystick is located behind client. Ventilator placement, recline or tilt of powerchair may necessitate location to side of client

Custom Designed Switch Controls/ Scanning Devices

1. Description

Enables powerchair to be driven through custom designed switching such as scanner or single switches.

2. Criteria for Use

- If client unable to safely and independently utilise other control options, a custom designed system may be necessary

3. Features Available

- Limited only by expertise and resources



Headrests

1. Description

Head rests provide head support on any mobility equipment.

Available in both off the shelf designs (Whit Kit, Ottoboch or major equipment suppliers), or can be individually customised)

2. Criteria for Use

Individuals with C3/C4 Quadriplegia and above require head support. Other circumstances may include:

- Clients with minimal or no head control
- Clients using tilt in space wheelchairs or shower chairs
- Individuals may require additional head support when travelling in taxis, or vans
- Clients with moderate to severe neck pain

3. Features Available

- variation in size possible
- most have three way positioning axis ie up/down, forward/back and angled

4. Key Points to Consider

- Head control
- Muscle imbalance
- Muscle fatigue
- Neck spasm
- Head straps
- Trial of a variety of designs and options is essential

- Ease of set up is important for reliable positioning from day to day, and during the day, as it is important to avoid frustrations
- Directions for set up should be very clear for carers/families involved
- Compatibility with specialised switches is required



Ventilator Attachment

1. Description

Required to utilizing a standard ventilator. Traditionally add length to chair

2. Criteria for Use

Individuals who are ventilator dependent, usually C3 and above.

3. Features Available

- Fixed attachment to chair
- Swinging attachment designed to accommodate tilting system
- Variation to ventilator cage possible on request to suppliers

4. Key Points to Consider

- positioning of and access to ventilator for carers.
- influence of increased length of chair in terms of access and chair selection
- set-up to allow for full tilt range
- influence of changing ventilator on chair prescription.
- change in centre of gravity can effect chair performance



If you would like further information please contact Occupational Therapists at SPOT

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